BENEATH THE STREETS.

A SUBTERRANEAN WORLD OF MARVELOUS INTEREST.

Chicago Fairly Honeycombed with Tunnels, Conduits and Sewers—Where Dens of Vice Abound—How the Great Water System Has Been Built Up.

NOT long ago a man walking along one of the busiest of Chicago's streets was suddenly projected several feet into the air. This singular occurrence, accompanied as it was by a loud report, revived memories of the dreadful anarchist bomb of May 4th, 1886, and caused quite a sensation in the neighborhood. But this soon subsided when it was discovered that the man was not seriously injured, and that the explosion had not been occasioned by dynamite, but by the bursting open of a "man-hole" produced by the pressure of noxious gases generated in the enormous sewer below.

The accident, which was trival in its results and excited but little comment at the time, suggests the subject of underground Chicago.

Every one has read and marveled at accounts of that wonderful relic of the ancient world, the catacombs of Rome, in which of old were buried the dead of the Eternal City, and yet few, even among Chicago's own people, know that below the level of her streets there is a subterranean world surpassing in interest the one beside the Tiber.

Chicago abounds in beautiful buildings—"massive and tall and grand," many of these rise to a height of two hundred feet and number thirteen stories and more. As the eye of the visitor sweeps their extensive fronts, rich in architectural designs and ornamentations, he forgets the solid foundations, reaching far into the earth, upon which the superstructure, vast and beautiful, is reared. The cost of the foundations of Chicago would suffice to build a city of no mean proportions. Hundreds of thousands of dollars are often expended on a single building before its granite walls rise to the level of the sidewalk. The space thus reclaimed from the "bowels of the earth" is utilized for boilers and engines to run the elevators and machinery for all manner of manufactories, to heat the vast structure, and furnish power to keep alive the electric lights in a whole block sometimes. Besides, many basements are fitted up as elegant restaurants, salesrooms and factories. In one of Chicago's basement restaurants more oysters are served during the "r months" than in any other single establishment in the world, metropolitan New York not excepted. Twice during the summer just past great rainstorms have overtaxed the sewers and caused the water to invade basements and cellars, to the great damage of property.

But the space below visible Chicago is not all used for the useful purposes mentioned. Many low saloons, resorts for thieves and thugs, where all manner of dark and diabolical crimes are concocted, discussed and perpetrated, are tucked away in basements secure from the observation of the casual passer-by. It is here that the almond-eyed Celestial conducts his laundry, too frequently but a fence or mask for an "opium joint," and the gratification of other vices of a still darker hue. Gambling houses of the "better" sort are usually situated high up in buildings, with openings to the roofs for egress in the event of an interruption in the form of a police raid; but the lower sort, particularly those operated and frequented by negroes, who are apt to be inveterate gamblers, are found in basements and cellars. These are often so connected with each other as to form a regular labyrinth, and render the inmates tolerably secure from arrest.

Pure water and good drainage are two of the principal requisites to the health of a city. These are supplied to the "Garden City" by underground systems which, together with the gas mains for furnishing light, fairly "honeycomb" the streets and justify the caption of "Underground Chicago."

The water-supply system of Chicago is unequaled in the world; and to such as

BRICKING UP THE LAKE TUNNEL.

have seen, or may hope to see something of it, a brief history will not prove uninteresting.

The first public effort in the direction of a supply of fresh water was on Nov. 10, 1834, when the Board of Trustees paid $95.50 for digging a well in the North Division. We will soon see to what majestic proportions this humble beginning has grown in a little more than half a century.

For many years water was peddled through the streets as potatoes and bananas are to-day. It was drawn about in hogsheads, on two-wheeled carts, and delivered to the good housewives at a cost of from five to ten cents per barrel, according to the competitions of trade. The hogsheads were filled from the lake with pails, and the water was discharged through a short leathern hose. Thousands of people still living in Chicago can remember when this system was in vogue.

In 1836 the Chicago Hydraulic Company was incorporated by an act of the Legislature. The panic which swept over the country the following year retarded the movement, and it was not until 1840 that work was actually begun. Two years later it was completed. The hydraulic system consisted of an 18-inch inlet from the lake, connecting with a well 15 feet in depth; a pumping works fitted with an engine of 25-horse power, capable of lifting each minute 25 barrels of water 35 feet above the level of the lake; two reservoirs of a capacity of 1,251 barrels each, both of which could be filled in one hour and forty minutes; and several miles of wooden pipes, none over six inches in diameter. This exceedingly modest system, as looked at to-day, was spoken of by the press at the time as a "marvelous achievement of engineering skill." In 1850, 9¼ miles of pipe and 1,000 hydrants were in use, but not more than one-fifth of the people were thereby supplied with water.

In 1851 the Chicago City Hydraulic Company was incorporated. This was done as the result of a popular vote of the people. Bonds were issued and sold in New York, and in the summer of 1852 work was begun at the foot of Chicago avenue, in the North Division. They were unable to put in a thirty-inch inlet pipe to reach six hundred feet out into the lake and were obliged to take the water from near the shore. On Feb. 15, 1854, water was first introduced into the buildings of the city. For four months water was only pumped nine hours a day, and not at all on Sunday, except in case of fire. In 1857 a twenty-four inch wrought-iron main was laid to the West Side, and in 1858 two new reservoirs with a capacity of 50,000 barrels each were constructed, one on the North and one on the West Side.

At first this system was fairly successful, but as the city increased in population and extended the limits the increasing sewage which flowed through the sluggish river into the great lake began to seriously contaminate the water, which was drawn from a point far from the shore. Not only did this cause enormous disease and death, but it worked great injury to the fair fame of the city, whose chief business it for its unwholesome, bad-smelling water. Besides this, as winter approached, great numbers of infinitesimal fishes sought the shore, and were thence delivered, along with the water, to every household.

An improved water supply thus became one of the greatest topics for discussion, both by the press and the people. All manner of schemes were proposed, debated, and rejected. At length Mr. E. S. Chesbrough, the City Engineer, originated the idea of constructing a tunnel, two miles in length, beneath the bed of Lake Michigan, which would literally tap the lake from the bottom at that distance from the shore, and through which pure water could be conveyed to the reservoir of the city.

After a good deal of delay to secure sanction from Congress and the State Legislature, and perfect the plans, the contract was let, for what was, indeed, a colossal undertaking.

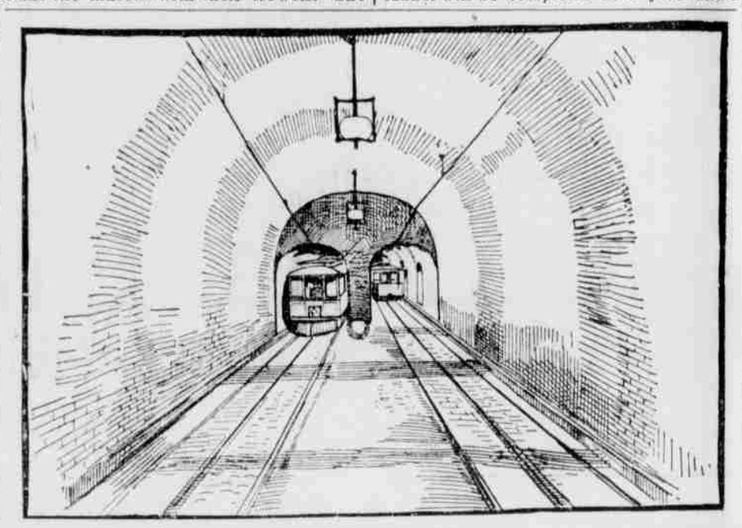
On St. Patrick's Day, March 17, 1864, the first shovelful of earth was removed amid ceremonies of an interesting and impressive character, and the great undertaking was commenced. The shore shaft was sunk on the side of the old pumping works, at the east end of Chicago avenue, on the shore of the lake. It was made about 9 feet in diameter, and 69 feet in depth. This was lined for 26 feet with a cast-iron cylinder 9 feet in diameter and 2¼ inches in thickness, below the cylinder the lining being of brick.

With the completion of the shaft began that nice engineering which one of the editors of the London *Times*, then in Chicago, declared to be "the greatest of modern times."

The point in the lake where the tunnel should terminate had been determined and marked with buoys, but the great difficulty was to run it in exactly the right direction, since the magnetic needle could not be relied upon for surveying below the surface of the lake. The only method of procedure was to run the axis of the tunnel parallel with a line drawn over the top of the shaft in exactly the right direction.

The work of tunneling was now begun in real earnest. The width of the tunnel when bricked up was to be five feet and its height five feet and two inches, the top and bottom arches being semi-circles, with two inches between. The space to be excavated being limited, but two men could work at one time; these were frequently relieved, and the work kept up night and day, without cessation.

Close behind the miners with their picks came the masons with their trowels. The



LA SALLE STREET TUNNEL.

masonry, of Illinois white brick, was eight inches in thickness, the bricks being laid lengthwise, with toothing joints to give them greater strength.

In this tedious way the workmen forced the great bore on under the lake, from fourteen to twenty feet being considered good progress for twenty-four hours.

As fast as the masonry was completed iron rails were laid, upon which small cars were run to remove the clay to the shaft, where it was elevated by steam power. At first the cars were pushed by men, but as the bore lengthened this became too slow and laborious, and two small mules were lowered through the shaft and used thereafter as the motive power.

As each thousand feet was completed chambers were dug in which brick, mortar, and other supplies could be stored and cars turned around.

As has been stated, the magnetic needle cannot be depended upon in surveying below the ground, but the level was in constant use, and by its means exactly the proper depth was constantly maintained. The tunnel was built with a slope of two feet to the mile in the direction of the shore, that it might be emptied in case of necessity. This was done a few years ago and the tunnel inspected by Chief Engineer (now Mayor) Cregier. He found it to be in perfect order, not a single crack or break being visible.

But the most remarkable part of the undertaking was performed at the lake end of the tunnel. The "crib" was constructed on shore. It is composed of huge timbers bolted together. It is 40¾ feet high, in pentagonal form, and nearly 100 feet in diameter. It was built in three sections or walls, one within the other, all so bolted together as to form one vast structure. At the corners it was armed with iron plates to protect it from floating ice, or any object in the water. Computed in "board measure," over 600,000 feet of lumber was used, together with 65 tons of iron bolts and 600 bales of oakum for calking. Before it was moved from the stocks where it was built $100,000 had been expended upon it.

On July 24, 1865, this vast structure was launched, and amid great excitement towed out to the place selected. There the compartments between the different sections were filled with stone, and the crib sunk to the bottom of the lake, where it was firmly secured by means of marine mooring screws, here used for the first time in America.

This accomplished, a shaft was sunk like the one on the shore and the work of tunneling was begun from the lake end of the sub-marine bore. The entire length of the tunnel is 10,587 feet, of which about four-fifths was constructed from the shore end.

FOOTWAY OF LA SALLE STREET TUNNEL.

On the 24th day of November, 1866, the two sections were united by cutting away the barrier of clay which remained and the great tunnel was one continuous tube from the shore to the crib, two miles away.

It was believed that the water supply thus provided for would be adequate for the needs of the city for a generation at least, but so enormous was the growth of Chicago that within six years steps were taken to increase it.

Early in 1872 the Board of Public Works purchased ground at the intersection of Bliss Island and Ashland avenues, about three miles south and more than two miles west of the shore end of the tunnel, where they propose to erect new pumping works. The supply of water was to be procured by means of a tunnel running diagonally across the city to the foot of Chicago avenue.

This second great work was begun July 15th, 1873, and completed in two years. The procedure was nearly the same as the first tunnel, and need not be described. The works consist of a tunnel seven feet in diameter and about four miles in length. This passes under the city below the bed of the river and the deepest of the city's foundations. The ground at the Ashland avenue pumping works is much higher than at the lake and considerable power is required to draw the water through the tunnel.

This great underground aqueduct draws its supply of water from the "crib," whose construction has been described. To accomplish this a second tunnel was constructed under the lake, and run parallel with the first, about sixty-three feet away. The new tunnel is about seven feet wide and seven feet and two inches high, and has a capacity about double that of the first one.

At present a third great tunnel is in course of construction under the waves of Lake Michigan. This was determined upon because the water now pumped from the

THE CRIB.

crib is sometimes contaminated by the sewage, particularly when great storms rage, and because it had become evident that the two North Side tunnels would not long supply the demands of the rapidly growing city. The shore shaft is near the foot of Twelfth street, two miles south of Chicago avenue. It will be four miles in length and is being constructed much like the others, except that dynamite is employed to loosen the clay.

Up to the present time a little more than half a mile has been constructed. For the first 250 feet it is eight feet in diameter. At that distance it became necessary to fork it out into two parallel tunnels six feet in diameter. The engineers hope to be able to unite them further on into the one eight-foot bore, but there is some uncertainty about it.

It is expected that the entire four-mile tunnel will be completed in a year and a half, after which the city will be insured an ample supply of pure water under all circumstances.

Six hundred and seventy-seven miles of water mains, varying in size from three to thirty-six inches in diameter, are in use. Of sewers there are 493 miles, varying in diameter from one to nine feet. Besides, the streets are filled with conduits for telegraph, telephone, and electric light wires, while the gas mains rival in extent those of the water department.

There are two passenger tunnels under the Chicago River, one at Washington street connecting the South and West Sides, and

CHINESE OPIUM JOINT.

one at LaSalle street connecting the South and North Sides, or divisions, of the city. They are triumphs of engineering, and cost in the aggregate about $1,000,000. Both of these great submarine thoroughfares have a double roadway for vehicles and one for pedestrians, the latter being entirely separate from the former. They are lighted by electricity.

The use of these tunnels has been sold to the North and West Side Street Railway companies. The one at LaSalle street has been for some time in successful operation, and the other is now undergoing repairs and alterations and will soon be in use. In both the motive power is a cable in connection with the regular "grip-car" lines. They do away with delays caused by the opening of bridges to permit vessels to pass, and will prove a substantial benefit to the people.

DWIGHT BALDWIN.

Arabella's Effort.

"Is, oh, is this really the love?" said Arabella Todkins, "that Amelia Ives and Abi Jinkman describe so thrillingly. Oh, tell me, Adolphus, is it the same?"

"It is, my love," answered Adolphus, tenderly, as he gave her a passionate embrace which nearly dislocated her left ear. "The very same."

"Are you certain, darling?" cried Arabella, lifting her beautiful head from the right-hand corner of his manly breast. "Oh, let there be no mistake."

"Describe your symptoms, dearest," answered Adolphus, gracefully displacing a fly which was nestling in her dimpled chin.

"I feel," said Arabella, as she gave a great gulp, "as if my heart would leap from my throbbing breast. My throat contracts and then expands. The muscles of my throat leap back and forth, and my windpipe——"

"Arabella," interrupted Adolphus, sadly, "go no farther; I regret your disappointment, but it's only an old-fashioned hiccough, and—you'll have to try again."

Do People Bite When They Love?

Bobby Crash (six years old)—Papa, do people bite when they love each other?

Papa Crash—No, my child. But why do you ask?

Bobby—Why, when Mr. Whitechoker, the preacher, was here the other day he said the Bible says we must love one another. Then ma was on his knee and he bit her in the mouth, and she hit him in the mouth more'n forty times.—*Dry Goods Chronicle.*

THE ENGLISH SOVEREIGN.

A Pleasant View of Queen Victoria.

THE QUEEN rises early in the morning, and after breakfast reads and answers her letters and transacts business. She is fond of the open air, and if the weather be favorable often has her papers taken into a tent or summer-house upon the lawn, which commands an extensive and most lovely view of Lochnagar, its surrounding mountains, and the Valley of the Dee.

After this comes a walk or a drive in a pony carriage, and then luncheon, at which no one is ever present except members of the royal family.

During the afternoon the Queen takes a long drive, often extending to over thirty miles and always in an open carriage. She dines late, never before 8:30 a. m. An hour spent in the drawing-room talking with the guests who may have been invited, finishes the day, and the Queen retires to rest.

No question of state is ever decided finally until her Majesty has been consulted, and she is such a sensible and clever woman that she has often put her Ministers right and settled a difficult point, and generally for the best.

The Queen is faithful to her old friends and thoughtful for everybody with whom she comes in contact, remembering the smallest details about them, their families, and their occupations, and giving evidence of this at most unexpected moments. A circumstance which happened to me justifies strongly the truth of this. Four years ago I was singing at the Royal Opera at Berlin, and was not even aware that the Queen knew of my engagement there. I, soon after my debut, was at a large dinner party at the English Embassy, and sitting next to me was one of the gentlemen of the Crown Princess' household. During dinner he put into my hand a telegram, telling me to read it. This was from the Queen to her daughter (now the Empress Frederick), recommending me to her and desiring her to do all she could for me. Needless to say that after this I was so excited that I could eat no dinner, and I insisted on keeping the telegram, one of my precious souvenirs.

Her Majesty is fond of music and is a good musician.

The Queen herself looks after the welfare of all her tenants and servants, and if any one of them is sick she is the first one to pay them a visit and take them little comforts.

During her stay in Scotland she takes a pleasure during her drives in stopping at various cottages to ask after the welfare of the inmates. When so occupied the Queen is as kind and simple as any ordinary lady could be.

A Senatorial Episode.

If the police will please look the other way a moment we will slyly slip in the following communication sent to us by a youmorist, who appears to have been marvelously inspired by the majestic scene that lay before him as he sat in the Senate gallery the other day. He entitles his prose epic "A Senatorial Episode." It canters along thus:

Sitting in the press gallery of the Senate recently I saw a Moody Senator Peck to the Gray Butler, who seemed to understand the signal, for he promptly proceeded to Call the Stewart, who hastily procured for the aforesaid Senator a Berry and a Plumb. Very soon thereafter he was seen to clasp both hands over his Vest, from which it was evident he was suffering great Payne. Thereupon a Sawyer suggested that the best remedy was a little Bate taken out of a black bottle, which was promptly administered, and in a short time the patient was as Hale as a country Squire dozing in his Pugh during the Sunday morning service.

"By George," said he, "that little Bate was worth a king's Ransom. Now, when I get the Barbour to give me a nice shave, and take a stroll on the grass Platt and down through the Paddock to the Quay, I will feel as happy as the bank Teller who has escaped to Canada with his pockets full of boodle. Then when I get to my quarters and Frye any fish caught in the Quay over a good Coke fire, I will be ready to go to bed and bid Farwell to earthly cares."

Now, he who cannot see the point of this story should procure a tallow-dip from the Chandler, by the light of which he may be able to Pierce the darkness that envelops his understanding.—*Washington Post.*

Married Without Knowing It.

It is not often that a young woman is married without knowing it, says the Chicago *Herald*, but that is what happened to Miss Belle Woods, a young lady at Schuyler, Neb. She was one of the guests at the wedding of a young lady friend a few days ago, and so was George Poole, a young man who had long been enamoured with her beauty. She was to officiate as bridesmaid and young Poole as best man. Just before the ceremony Poole called the clergyman aside and told him privately that he and Miss Woods were to be married, too, and suggested that a change in the order of the ceremonies would be an interesting surprise for the audience. The guests, as he had surmised, were completely astonished when he and Miss Woods came forward and went through a regular marriage ceremony. The other wedding followed immediately, and then everybody wanted to know what it all meant. On being told that she was Poole's wife Miss Woods becomingly fainted and in "coming to" said that she had supposed herself to be merely going through the performance of her duties as a bridesmaid, and that she should never, never be the wife of the wicked Poole. Nothing has since changed her mind, and a legal separation has been applied for.

The place to see an acrobat is when you are "half seas over."